

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously presented) An optical switch/variable attenuator comprising:
a polarization separating sub-system;

at least one switchable transmission diffraction grating; and,

a polarization recombining sub-system;

means for varying a diffraction efficiency of said at least one switchable transmission diffraction grating;

said polarization separating sub-system being optically disposed to receive an input optical beam of arbitrary polarization and also being capable of separating the input optical beam into a first optical beam of a first polarization and a second optical beam of a second polarization, said second polarization being distinct from said first polarization, and emitting a first emitted optical beam of the first polarization and a second emitted optical beam of the first polarization, said emitted first and emitted second optical beams constituting an input channel of the first polarization;

said at least one switchable transmission diffraction grating being optically disposed to receive the input channel and capable of providing at least one transmitted channel, the at least one transmitted channel comprising at least one transmitted optical beam of the first polarization and at least one other transmitted optical beam of the first polarization; said at least one switchable transmission diffraction grating constituting a set of switchable transmission diffraction gratings; and,

said polarization recombining sub-system being optically disposed to receive the at least one transmitted optical beam of the first polarization and the at least one other transmitted optical beam of the first polarization and capable of recombining the at least one transmitted optical beam of the first polarization and the at least one other transmitted optical beam of the first polarization into at least one final output beam; said at least one final output beam constituting a set of output beams.

2. (Previously presented) The optical switch/variable attenuator of claim 1 further comprising:
 - a static grating optically disposed between said at least one switchable transmission diffraction grating and said polarization recombining sub-system; and,
 - wherein said at least one switchable transmission diffraction grating comprises one switchable transmission volume diffraction grating.
3. (Previously presented) The optical switch/variable attenuator of claim 1 further comprising:
 - at least one control element capable of controlling switching of said at least one switchable transmission diffraction grating.
4. (Previously presented) The optical switch/variable attenuator of claim 1 further comprising:
 - a static grating optically disposed between said polarization separating sub-system and said at least one switchable transmission diffraction grating; and,
 - wherein said at least one switchable transmission diffraction grating comprises one switchable transmission diffraction grating.
5. (Previously presented) The optical switch/variable attenuator of claim 1 wherein said set of switchable transmission diffraction gratings comprises two switchable transmission diffraction gratings;

a first of said two switchable volume transmission diffraction gratings being optically disposed between said polarization separating sub-system and a second of said two switchable volume transmission diffraction gratings; and,
the second of said two switchable volume transmission diffraction gratings being optically disposed between the first of said two switchable volume transmission diffraction gratings and said polarization recombining sub-system.

6. (Original) The optical switch/variable attenuator of claim 2 wherein said static grating includes a transparent region.
7. (Previously Presented) The optical switch/variable attenuator of claim 6 further comprising:
two output beam ports; and,
wherein said set of output beams comprises two final output beams;
each one of said two output beam ports being capable of receiving from said polarization recombining sub-system one final output beam from said two final output beams.
8. (Previously Presented) A method for providing variable attenuation of a beam, the method comprising the steps of:
providing an optical system, said optical system comprising at least one switchable volume diffraction grating and a static grating;
providing an input beam to said optical system;
enabling the at least one switchable volume diffraction grating to diffract, with a predetermined diffraction efficiency, the input beam into a diffracted beam and a transmitted beam; and,
utilizing the predetermined diffraction efficiency to effect the variable attenuation of the input beam;
wherein said at least one switchable volume diffraction grating constitutes a set of switchable volume diffraction gratings.
9. (Previously Presented) The method of claim 8 wherein the set of switchable volume diffraction gratings comprises one switchable volume diffraction grating; and,

wherein the switchable volume diffraction grating is optically disposed to receive the input beam.

10. (Previously Presented) The method of claim 8 wherein the set of switchable volume diffraction gratings comprises one switchable volume diffraction grating; and, wherein the static grating is optically disposed to receive the input beam.
11. (Withdrawn) A method for switching one input optical beam to two output beams, the method comprising the steps of:
 - providing a switchable volume diffraction grating;
 - providing a static grating having a transparent region;
 - enabling said switchable volume diffraction grating to diffract, with a predetermined diffraction efficiency, the input optical beam into a diffracted beam and a transmitted beam;
 - diffracting, with a predetermined diffraction efficiency, the input beam into a diffracted beam and a transmitted beam;
 - diffracting the diffracted beam utilizing the static grating; and,
 - transmitting the transmitted beam through said transparent region;wherein the diffracted beam and the transmitted beam comprise the two output beams.